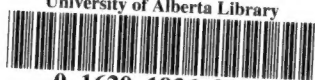


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Cultural Practices for Fodder Crops in Manitoba

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CULTURAL PRACTICES FOR FODDER CROPS IN MANITOBA

Classification of Forage Crops Generally Grown in Manitoba

- (a) Grasses: Western ryegrass, meadow fescue, timothy and brome grass.
- (b) Grass mixtures.
- (c) Legumes: Alfalfa and sweet clover.
- (d) Grass and legume mixture.
- (e) Annual Hays: Oats, millets and Sudan grass.
- (f) Corn.

Factors Influencing the Choice of Crop to Grow

These factors are (a) the purpose for which the crop is required, (b) the location and soil peculiarities of the farm, (c) climatic conditions. The latter point is of wide importance. An example of this is the fact that meadow fescue is grown satisfactorily only in the Red River Valley region and in localities in Northwestern Manitoba where moisture is usually more abundant than on drier soils of the open prairies, and that red and alsike clovers do well on the moist loams and clay soils of Eastern and Northern Manitoba but are of little use in the drier grain areas.

Grasses

ADAPTATION.—*Western ryegrass* is well suited to a wide variation of soil and climate, but like most farm crops does best in a rich, dark, fairly moist loam. *Meadow fescue* is considerably more restricted to the heavier and moister soils of the Red River Valley, the Riding Mountain Drift and Swan River Valley. *Timothy* has a wide adaptation but cannot be depended upon to yield heavily unless on rich clay or clay loam soils where moisture is abundant. *Brome grass* is a strong grower on almost all Manitoba soils. Because of its spreading root habit it is decidedly persistent and in heavy soils becomes a nuisance, when it has to be ploughed up and cleaned out. On light soils, it fills a real need where persistency is required. It has been grown less in recent years since the introduction of sweet clover, its principal use being for meadows and pastures where greater permanency is required. In crop rotations where hay remains down only one to three years, brome does not fit in because of the difficulty of getting the land free from it for succeeding grain crops.

PREPARATION OF LAND.—For each of these grasses the seed-bed should be well worked, firm, with abundance of moisture. Thoroughly worked summer-fallow provides the best kind of seed-bed, and unless circumstances prevent, this should always be the kind of preparation for grasses or clovers on the prairies.

METHODS OF SEEDING.—The methods generally used for sowing grass seeds are:—(1) through the ordinary grain drill, the grass being mixed with whichever grain is used as a nurse crop, (2) through the grass seed attachment on the drill (this method is useful only for the heavier, freer, running seeds such as timothy), (3) by use of the wheel barrow broadcast seeder, (4) broadcasting by hand.

WITH VERSUS WITHOUT A NURSE CROP.—If a good summer-fallow seed-bed is used there is no reason why seeding grasses with a nurse crop should not be successful, excepting, perhaps, on the lighter prairie soils. On Dominion Illustration Stations in Manitoba grasses have frequently been seeded with grain crops both on summer-fallowed land and on fields which had previously carried from one to three successive grain crops. At Dauphin, Dugald, Pipestone and Plumas which represent a wide variation in soil and moisture conditions, experience has shown that grasses do not as a rule do well when seeded with a nurse crop on land growing its second or third successive grain crop. At Dauphin, on one of the richest soils in Manitoba, and on a perfectly prepared seed-bed, Western ryegrass, meadow fescue and alfalfa failed to make a stand both in 1929 and 1930 when seeded with the third successive crop of grain. The 1929 season was very dry but rainfall was reasonably abundant in 1930. Similar results were experienced at Dugald in 1930. The grass at this latter point made a good start with the nurse crop but disappeared during the hot dry weather in July and August. This is seldom experienced when seeding is done on summer-fallow. The rate of sowing the nurse crop has an influence on the catch of grass. On land prepared from grain stubble it is advisable to reduce the regular quantity of grain sown by about one-third. On summer-fallow land the usual rate, or a reduction of one fourth should be satisfactory.

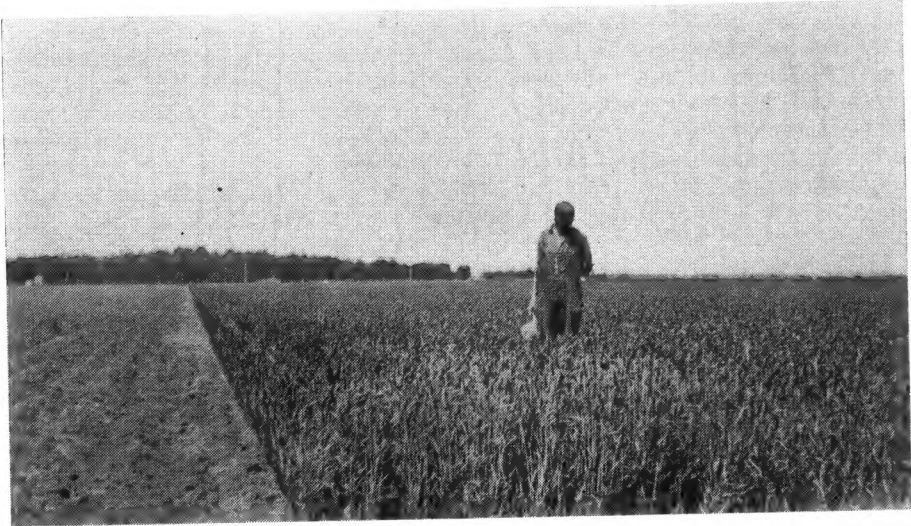
AMOUNT TO SOW PER ACRE.—No hard and fast rules govern the rate of seeding. The chief determining factors are: (a) condition of the seed-bed, (b) method of seeding, whether with or without a nurse crop, (c) cleanliness and vitality of the seed. It is reasonable to presume that a firm, smooth moist seed-bed will be more conducive to the germination of grass seeds than will a dry lumpy preparation. On many of our farms where seeding to grasses is being done for the first time since the land was broken from prairie 40 to 50 years ago, soil conditions are not the most receptive to grass crops. Generally speaking, it pays to use plenty of seed. Western ryegrass and Brome can usually be seeded at the same rate of 14 to 18 pounds per acre. Meadow fescue will give good results when from 12 to 15 pounds are used. Timothy requires from 6 to 10 pounds. When seeding without a nurse crop, slightly less than the above rates can be applied. The rate can also be reduced on light soils and increased on richer, heavier, soils where there is substance to develop and carry a heavy crop.

Grass Mixtures

Western rye grass and meadow fescue mix well in localities suitable to the latter. In fact, a mixture on a suitable soil and location is to be preferred because under prairie conditions the fescue develops a thicker bottom growth while the rye grass has more top. The two therefore make a compatible mixture that will usually yield better than either alone. They can be seeded at the rate of 8 pounds each per acre or 6 of fescue to 10 of rye grass.

Timothy, also mixes well with rye grass and enhances the quality of hay. Four pounds of timothy to 8 to 10 of rye grass is recommended.

A mixture of brome with any one or two of the above grasses is not recommended but rather brome with a legume such as sweet clover. The spreading root habit of brome makes such strong competition for the bunch grasses such as rye grass and fescue, that after a few years from sowing on a permanent meadow brome has possession of the field.



Reward wheat on the Illustration Station at Dauphin, Manitoba, June 24, 1930. This field grew a heavy crop of mixed alfalfa and grass hay in 1928 and 1929. It was broken on August 4, 1929, and yielded 40 bushels per acre of No. 1 wheat in 1930.



Corner of alfalfa field on the Illustration Station at Dauphin, Manitoba, June 24, 1930. Two crops in 1930 gave 4.67 tons per acre. This field has been down 6 years.

Legumes

ALFALFA

ADAPTATION.—This deep rooted perennial is suited to nearly every locality in Manitoba. The seed is high priced which makes it an expensive crop to sow. Therefore its profitableness depends upon the number of years it will remain down and yield good crops. A soil that is conducive to a long period of usefulness is most desirable. A crop of alfalfa reaches its greatest tenacity on the heavier clay soils of the Red River Valley and on the rich loams of the Riding Mountain Drift. On light soils persistency over a fair length of time can usually be secured if the soil is thoroughly prepared prior to seeding. Alfalfa will not, however, succeed on alkali soils.

On the Illustration Stations at Dauphin, Gilbert Plains, Dugald and Petersfield alfalfa has been the most profitable crop grown over a five-year period but on the light loam soils at Plumas, Ste. Rose and Katrime it has not met with complete success.

PREPARATION OF LAND AND METHOD OF SEEDING.—Soil should be in first class shape for alfalfa. That means, a firm, moist seed-bed free from weeds. It has not been an unusual experience on Manitoba farms to have to break up an alfalfa field after the first or second year because of the inroads of weeds. Couch grass, perennial sowthistle and Canada thistle are among the worst enemies and care should be taken to have these weeds well eradicated before alfalfa is seeded. A very clean and well prepared summer-fallow is none too good for such expensive seed as alfalfa.

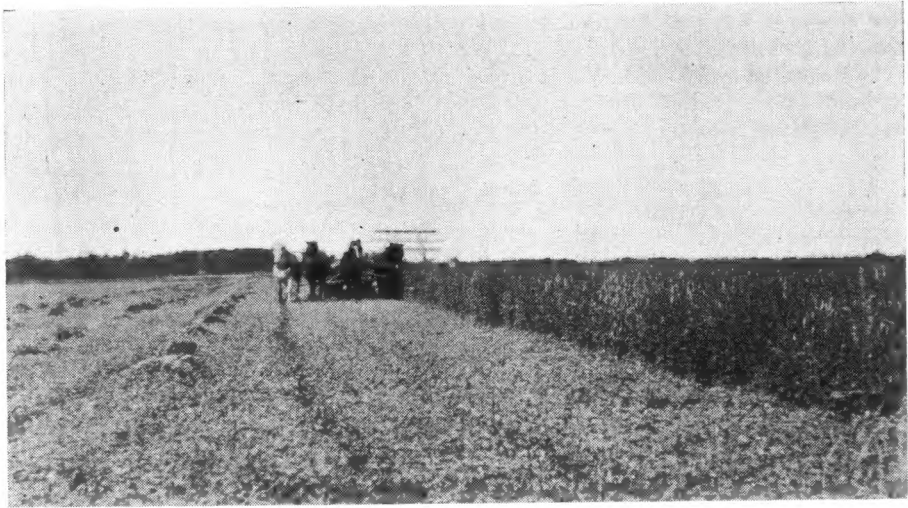
For best results alfalfa should be seeded without a nurse crop. On good land, well prepared, however, it does quite well with a nurse crop. Wheat is probably best since it is advantageous to sow the legume early in the spring when moisture conditions are favourable. When a nurse crop is used alfalfa can either be seeded through the drill mixed with the nurse crop, through the grass seed attachment on the drill, or, by use of the wheel barrow broadcaster. When seeding through the drill care must be exercised to see that the seed is not placed too deeply. Catches are frequently lost, or are seriously thinned by this error. On one of the Manitoba Illustration Stations in 1930 there was a good example showing the importance of depth of sowing. A perfect stand was secured on firm places in the field where the seed did not go below 2 inches, but on soft places where the drill sank to 3 and 4 inches few alfalfa plants appeared. When broadcasted, harrowed in, and packed, alfalfa seldom fails to make a good stand providing other factors are favourable. This is the method most highly recommended.

SEED TREATMENT AND AMOUNT TO SOW.—Hard seeds, impervious to water and which lie dormant in the soil for lengthy periods, help to reduce the stand. Scarifying makes it possible for these seeds to absorb water and germinate in a normal time. It is therefore advisable to buy scarified seed or if home grown seed is used to have it scarified.

If alfalfa is to be sown on a field which has hitherto had neither sweet clover nor alfalfa, inoculation of the seed with radicle culture repays the small amount of expense and time involved for this treatment.

When alfalfa is sown with a nurse crop 14 to 16 pounds per acre should be applied. Without a nurse crop 10 to 14 pounds are sufficient.

SUBSEQUENT CARE.—During the first season after alfalfa is seeded positively no trampling or pasturing by live stock should be permitted. If no nurse crop is used several clippings with the mower should be done to keep weeds in check.



Sweet clover in a three-year rotation of corn, wheat seeded to clover, clover hay and break, on the Illustration Station at Plumas, Manitoba.



A field of sweet clover on the Illustration Station at Gilbert Plains, Manitoba. On the left side the nurse crop was oats seeded late in May; on the right side wheat seeded late in April. The left side produced no sweet clover while the right side produced a fair crop.

In the second and succeeding years, with favourable conditions, two or even three crops of hay may be cut. The first should be off before the middle of July, the second by the middle of August and unless growth is vigorous a third crop should not be taken. It is at least a safe practice to refrain from cutting after the first week of September and no close pasturing towards fall should be permitted. Different environmental conditions appear to give varying reactions to fall cutting. At Dauphin over a five-year period early October cutting has had little injurious effect upon a very fine field of alfalfa, while at Dugald near Winnipeg cutting at this date has thinned the stand by almost one-third.

SWEET CLOVER

ADAPTATION.—This crop is grown successfully in nearly every part of Manitoba and on many kinds of soil. At Eriksdale on hard stony soil it makes a thick stand and produces a hay of excellent quality. On heavy soils unless very thick stands are secured it has a tendency to grow tall and decidedly coarse. On the Illustration Stations at St. Rose, Plumas and Pipestone, where soil is light, thick stands are usually secured when seeded with a nurse crop but frequently these stands are thinned into patches by the following spring. Whether this is caused by winter-killing or by disease has not been clearly determined, but the fact remains that sweet clover cannot be considered much hardier than alfalfa for Manitoba conditions.

PREPARATION OF THE LAND AND METHODS OF SEEDING.—Sweet clover, because of its rapid and tall growth, succeeds on dirtier land than does alfalfa and other perennial crops. It makes a satisfactory stand on well prepared stubble land but a summer-fallow seed-bed is most dependable. It does quite well with nurse crops and because of its biennial nature, and the use generally made of it in our grain growing system of farming, it seldom is profitable to sow it alone.

It can be seeded by methods similar to those mentioned for alfalfa, taking like precautions as to the depth. Best results can be expected when it is seeded with wheat on summer-fallow. Late sowing with oats or barley on fall or spring ploughed stubble land which is dry and lumpy, has in numerous instances resulted in a failure or in weak stands. If the spring is favourable and the seed-bed in good shape this latter preparation should be satisfactory.

AMOUNT TO SOW.—This depends upon the tilth of the seed bed, the vitality of the seed and the competition expected from the nurse crop. The germinability of the seed should be determined before sowing. If not scarified, 15 to 20 pounds per acre should be used. If scarified, 12 to 15 pounds will usually be sufficient. Inoculation insures a better crop on land which has not previously been in sweet clover or alfalfa.

SUBSEQUENT CARE.—Once a stand of sweet clover has been secured little subsequent care is required other than to avoid close pasturing the first fall. For hay, the crop should be cut, preferably with the binder, when the plants are about one-third in blossom. If the weather is dry it is good practice to allow the sheaves to remain on the ground as discharged from the binder for two days or so. This will dry them rapidly and if the weathered side of the sheaf is placed inside when stooking it will greatly lessen the probability of moulding.

Grass and Legume Mixtures

Alfalfa and Western rye grass make a strong growing mixture. In this manner alfalfa can be worked into a crop rotation, where hay is left down only two years, and where it would be too expensive to use alfalfa as a single hay

crop. However, for a permanent hay field on soil well suited to alfalfa it would be more profitable to grow it alone because after the first cutting of a mixture each year the grass ceases growth while the alfalfa is usually too weak to be worth a second cutting. On the other hand on light soils where one cutting of alfalfa is the usual expectation each year, a grass mixed with it has advantages. The legume is deep rooted while the fibrous grass roots are shallow feeders. This combination usually develops a heavier one-cut crop than could be secured from either legume or grass alone. A seed application of 8 pounds each per acre or 6 pounds alfalfa to 10 pounds of rye grass is recommended.

Meadow fescue can be used in addition to rye grass, with alfalfa, in localities to which fescue is suited. When these three are used, the usual rate of seeding is five pounds of each. This mixture has given good results on Illustration Stations, in a six-year rotation where hay is left down two years.

Alfalfa and timothy make a good mixture in moist regions. At Arborg and Petersfield in the Lake Winnipeg area this crop has yielded abundance of first class hay. The rate of seeding used is 6 to 8 pounds of alfalfa and 4 to 6 pounds of timothy.

Annual Hays

SIXTY-DAY and other varieties of oats make good annual hay crops. The first mentioned has been grown on several Illustration Stations with successful results. The usual place for such a crop has been on land infested with wild oats. The land is shallow ploughed in the fall and harrowed in early spring. About May 20 ploughing is again done if the growth of wild oats is strong, and a thoroughly smooth, firm seed bed prepared. The oats are seeded at the rate of 2 to 3 bushels per acre. Cutting is done with the binder just as the tip kernels are turning yellow. Small sheaves are made and cured similarly to those of sweet clover.

Millet and Sudan grass fit in fairly well as catch hay crops to sow alone in June. These grasses have not as a rule been as acceptable for hay as oat sheaves.

Corn

ADAPTATION.—This crop can be grown successfully in most localities in Manitoba south of the Dauphin-Roblin line of the C.N.R. Good crops are at times grown in the Swan River Valley but early fall frosts are too common in this territory to assure annual success with corn. At Arborg in the interlake district corn was a failure on Illustration Station fields during the four consecutive years 1926 to 1929. Late spring and August frosts are usual in this region.

SOIL AND ITS PREPARATION.—The usual place for corn is at the end of a grain rotation where it replaces summer-fallow. At this point in the rotation it fits into our grain system of farming but the condition of the soil following two or three successive grain crops is not conducive to a successful crop of corn. Such land is usually weedy, and a profusion of weeds in a corn crop either requires more labour than can profitably be absorbed, or the weeds are permitted to flourish and the land to become dirtier than before which in turn militates against the success of whatever grain crop follows.

SEEDING AND SUBSEQUENT CARE.—As a rule corn does best when planted during the first half of May. The amount of seed to apply per acre is dependent on the size of kernels and whether sowing is done with the grain drill or by means of a corn planter. The former takes 30 pounds of seed per

acre while if the planting machine is used to check row, 12 to 18 pounds per acre is sufficient. On clean land, sowing with the ordinary grain drill, spacing the rows 36 to 42 inches apart is perfectly satisfactory. However, by means of the planter check rows can be made which facilitates horse cultivation in several directions and reduces to a minimum the hand labour necessary to maintain a clean crop.

To kill the numerous weeds which are sure to start in a corn field soon after planting, there is probably no more effective and practical method than harrowing every four to five days until the plants are 6 or 7 inches tall. If the harrows are light and driven parallel with the corn rows, preferably during the heat of the day when corn plants are wilted, vast numbers of weeds will be killed with very little injury to the corn. Careful and sufficient harrowing at this time of year will greatly reduce the intertillage necessary during the summer.

Place for Fodder Crops in a Crop Rotation

The usual place for fodder crops has been at the end of whatever rotation is in use. A common practice is to have two or three years of grain followed by one to two years of hay and pasture. On fairly clean land and in moist seasons, seeding at this point in a rotation will give satisfactory results. However, on the majority of Manitoba farms this cannot be recommended as a sound general practice. There are several arguments which do not favour seeding either grass or legume crops with the last grain crop. Some of these are (a) the hazard of getting a catch in dry seasons, (b) land following successive grain crops is usually too weedy to expect a satisfactory stand of most hay crops, (c) the practice of growing a hay crop in place of summer-fallowing is not a good one and results in lowered grain yields unless very careful cultural methods are employed.

A farmer does not usually seed grass or legumes unless he needs the crop. He expects success. Therefore the best place for seeding down in a rotation should be carefully considered. If a nurse crop of grain is used undoubtedly the best place is on summer-fallow land in a well balanced rotation.

The following rotations are nearly all under demonstration on Illustration Stations in Manitoba. They are recommended not as definite systems, but rather as suggestions relative to the best arrangement for working fodder crops into a rotation.

Group 1—

Rotations in this group are designed chiefly for the purpose of using fodder to clean up weedy land.

- (a) First year—Wheat.
Second year—Barley seeded to sweet clover.
Third year—Hay and break.

This rotation is well suited for growing out wild oats but cannot be expected to yield heavily unless very careful tillage is given after hay is removed and also in preparation for barley.

- (b) First year—Wheat.
Second year—Sixty-day oats for hay seeded to sweet clover.
Third year—Hay and break.

This rotation is particularly effective for cleaning out wild oats, sowthistle and Canada thistle.

- (c) First year—Summer-fallow.
Second year—Wheat seeded to clover or rye grass and clover mixture.
Third year—Hay and break.
Fourth year—Oats and barley.

Group 2—

Rotations under this group embody features adapted to a well balanced mixed farming system.

- (a) First year—Summer-fallow.
 Second year—Wheat seeded to grass and clover.
 Third year—Hay and break.
 Fourth year—Wheat.
 Fifth year—Oats or barley.
- (b) First year—Summer-fallow.
 Second year—Wheat seeded to grass and alfalfa.
 Third year—Hay.
 Fourth year—Hay and break.
 Fifth year—Wheat.
 Sixth year—Coarse grains.
- (c) First year—Summer-fallow.
 Second year—Wheat.
 Third year—Barley seeded to grass and clover.
 Fourth year—Hay and break.
 Fifth year—Oats.

For Corn—

- First year—Summer-fallow.
- Second year—Part corn, remainder in wheat seeded to clover and grass.
- Third year—On corn land wheat, remainder clover hay and break.
- Fourth year—Wheat on whole area.
- Fifth year—Coarse grain.

In the second course of this rotation corn is switched to the land previously in sweet clover and vice versa.

The Importance of Summer Breaking and Tillage of Hay Fields

The chief cultural concern in rotations where hay crops are grown is to shape the land for successful grain crops following hay. This land should be ploughed before the end of July and well worked down. It is then in a position to store moisture and by the action of weather elements to be readily worked into good seed-bed condition the following spring. This practice is rigidly adhered to on Illustration Stations unless unsurmountable difficulties arise. Results in 1930 from twelve Stations scattered over Manitoba indicate that 18 fields broken from hay sod averaged 20·70 bushels of wheat per acre while 19 fields on bare summer-fallow land averaged 19·70 bushels per acre.

